

### **ABSTRACT OF THE DISCLOSURE**

A system for forming a precision shaft for a permanent magnet motor employs a working surface region of the precision shaft and a coaxially arranged rotor region. A cutting tool is used to make a first machining or cutting pass along the entire length of the working and rotor regions. Subsequent passes of the cutting tool are limited to the working region of the motor shaft to form a threaded ball screw shaft portion. The rotor region, however, remains with but a continuous shallow groove that is surrounded by a helical shaft portion having the original diameter of the precision shaft. Thus, preparation of the shaft to effect bonding of the magnetic rotor does not affect the shaft diameter. The depth of the shallow groove in the rotor region is approximately between 0.001" and 0.004", and preferably 0.003". The permanent magnet rotor is bonded to the rotor surface region of the precision shaft by an A+B heat cured type of epoxy.